

REMARKS

Claims 1-5 and 16-22 were pending in the above-identified application when last examined and are amended as indicated above. The claim amendments clarify the claim language and are not intended to limit the scope of the claims.

Claims 1-5, 16-18, 20, and 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,793,487 (Takahashi) in view of “Angular Dependence of Polarizing Beam-Splitter Cubes,” Applied Optics, Vol. 39, No. 16, pp 1916-1929, (Pezzaniti). Applicant respectfully traverses the rejection.

Claim 1 distinguishes over the combination of Takahashi and Pezzaniti at least by reciting, “An interferometer comprising: a laser system that produces a heterodyne beam ...; a coated polarizing beam splitter oriented so that the heterodyne beam has a non-zero incidence angle with the coated polarizing beam splitter, the coated polarizing beam splitter splitting the heterodyne beam into a first beam and a second beam.”

Takahashi discloses an interferometer but does not disclose or suggest a coated polarizing beam splitter oriented so that a heterodyne beam has a non-zero incidence angle. Pezzaniti similarly fails to disclose or suggest this feature.

Pezzaniti is directed to characterizing the field-of-view properties of polarizing beam splitter cubes for uncollimated light. See the abstract of Pezzaniti. Sections 2-4 of Pezzaniti describe the dependence of aberrations on the angle of incidence for ideal coated polarizing beam splitters that have optimal diattenuation for a beam at normal incidence. In particular, Pezzaniti defines six “figures of merit” for characterizing angular dependence of aberration. Section 5 and 6 of Pezzaniti describe measurements of “the six figures of merit” for real polarizing beam splitters. This characterization of polarizing beam splitters is useful in systems where beams are either uncollimated or subject to pointing errors. See the paragraph beginning at the bottom of the left hand column of page 1916 of Pezzaniti. Accordingly, Pezzaniti describes angular variations as undesirably causing aberrations, and Pezzaniti in combination with Takahashi fails to suggest use of a polarizing beam splitter at an angle in an interferometer, where the input beam can be positioned at normal incidence, i.e., at the angle for which an ideal polarizing beam splitter provides optimal diattenuation.

In contrast, Applicant appreciated that the properties of real polarizing beam splitters may permit improvement of polarization separation if the polarizing beam splitter is rotated to a non-zero angle that depends on the specific polarizing beam splitter. The combination of Takahashi and Pezzaniti fails to suggest this use of polarizing beam

splitters in interferometers.

Accordingly, the combination of Takahashi and Pezzaniti fails to disclose or suggest “An interferometer comprising: … a coated polarizing beam splitter oriented so that the heterodyne beam has a non-zero incidence angle with the coated polarizing beam splitter” as recited in claim 1. Claim 1 is thus patentable over Takahashi and Pezzaniti.

Claims 2-5 and 16-18 depend from claim 1 and are patentable over Takahashi and Pezzaniti for at least the same reasons that claim 1 is patentable over Takahashi and Pezzaniti.

Independent claim 20 similarly distinguishes over the combination of Takahashi and Pezzaniti by reciting, “An interferometer comprising: … a polarizing beam splitter containing a coating oriented so that the heterodyne beam has an incidence angle with the coating that differs from 45°, the coating splitting the heterodyne beam into a first beam and a second beam respectively having the first and second frequencies.” As noted above, although Pezzaniti describes the angular dependence of aberrations in the output beams of polarizing beam splitters, the combination of Pezzaniti and Takahashi fails to suggest orienting a polarizing beam splitter at an angle in an interferometer such as described by Takahashi, where a collimated beam can be directed for high precision incidence at 45° with a PBS coating.

Claim 20 and claim 21, which depends from claim 20, are thus patentable over the combination of Takahashi and Pezzaniti.

For the above reasons, Applicant requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

Claims 19 and 22 were rejected under 35 U.S.C. § 103(a) as unpatentable over Takahashi in view of Pezzaniti and further in view of U.S. Patent No. 4859029 (Durell). Applicant respectfully traverses the rejection.

Claims 19 and 22 respectively depend from claims 1 and 18, which are patentable over Takahashi and Pezzaniti for the reasons given above.

Durell describes a “continuously variable ratio beam splitter and beam launcher for dividing an input light beam, particularly a polarized coherent light beam, into two output beams, within a broad intensity variation range between the beams which may approach zero to 100%, without loss of polarization.” See the abstract of Durell. Durell is thus directed to a specific non-polarizing beam splitter, and like Takahashi and Pezzaniti, Durell fails to suggest an interferometer with a coated polarizing beam splitter at a non-

zero angle. Accordingly, claims 1 and 20 and claims 19 and 22 are patentable over the combination of Takahashi, Pezzaniti, and Durell.

Claim 19 further distinguishes over the combination of Takahashi, Pezzaniti, and Durell by reciting, “a mounting structure containing the coated polarizing beam splitter, wherein the mounting structure permits adjustment of an orientation of the coated polarizing beam splitter during an alignment process that sets the non-zero incidence angle.” Claim 20 further distinguishes over the combination of Takahashi, Pezzaniti, and Durell by reciting, “a mounting structure containing the polarizing beam splitter, wherein the mounting structure permits adjustment of an orientation of the polarizing beam splitter during an alignment process that sets the non-zero angle.” As noted above, Durell is directed to a specific type of non-polarizing beam splitter that can be rotated to change the ratio of the reflected and transmitted intensities. Takahashi, Pezzaniti, and Durell fail to provide any motivation for using such a mounting for a coated polarizing beam splitter.

For the above reasons, Applicant requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

In summary, claims 1-5 and 16-22 were pending in the application. This response amends claims 17 and 18 to correct errors. For the above reasons, Applicant respectfully requests allowance of the application including claims 1-5 and 16-22.

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